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SPECIALIZED INSTRUMENTATION FOR COMPUTATIONAL FLUID  
DYNAMICS RESEARCH(U) CINCINNATI UNIV OH DEPT OF  
AEROSPACE ENGINEERING AND ENGINEER. K N GHIA JUN 87

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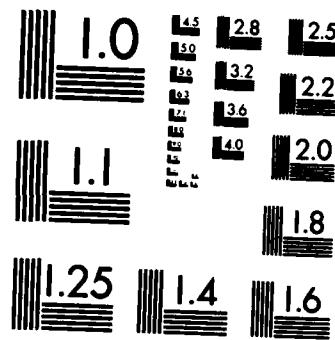
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## REPORT DOCUMENTATION PAGE

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3. DISTRIBUTION/AVAILABILITY OF REPORT

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5. MONITORING ORGANIZATION REPORT NUMBER IS

AFOSR-TR-87-1175

4a. NAME OF PERFORMING ORGANIZATION  
UNIVERSITY OF CINCINNATI4b. OFFICE SYMBOL  
T (if applicable)7a. NAME OF MONITORING ORGANIZATION  
AFOSR/NA4c. ADDRESS (City, State and ZIP Code)  
AEROSPACE AND ENGINEERING SCIENCES  
UNIVERSITY OF CINCINNATI  
CINCINNATI, OH 45221-0070

7b. ADDRESS (City, State and ZIP Code)

BUILDING 410  
BOLLING AFB, DC 20332-64488a. NAME OF FUNDING/SPONSORING  
ORGANIZATION AFOSR/NA8b. OFFICE SYMBOL  
NA (if applicable)9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER  
AFOSR-84-02754e. ADDRESS (City, State and ZIP Code)  
BUILDING 410  
BOLLING AFB, DC 20332-6448

10. SOURCE OF FUNDING NOS.

PROGRAM  
ELEMENT NO  
61102FPROJECT  
NO.  
2917TASK  
NO.  
A1WORK UNIT  
NO.11. TITLE (Include Security Classification)  
(U) SPECIALIZED INSTRUMENTATION FOR

COMPUTATIONAL FLUID DYNAMICS RESEARCH

12. PERSONAL AUTHOR(S)  
K. N. GHIA13a. TYPE OF REPORT  
FINAL13b. TIME COVERED  
FROM 1EROM TO 1TO14. DATE OF REPORT (Yr., Mo., Day)  
JUNE 198715. PAGE COUNT  
3

16. SUPPLEMENTARY NOTATION

15 July 84-14 Feb 86

17. COSATI CODES

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

FIELD	GROUP	SUB GR

COMPUTATIONAL FLUID DYNAMICS, INSTRUMENTATION ←

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

A Perkin-Elmer 3250 MPS computer system was purchased. To assure more reliable operation, negotiations to replace this with a model 3280 MPS system were completed. (Key word) -

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20. DISTRIBUTION/AVAILABILITY OF ABSTRACT

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21. ABSTRACT SECURITY CLASSIFICATION

UNCLASSIFIED

22a. NAME OF RESPONSIBLE INDIVIDUAL

JAMES D WILSON

22b. TELEPHONE NUMBER  
(Include 202-767-4935)

202-767-4935

22c. OFFICE SYMBOL

AFOSR/NA

AFOSR-TK-87-1175

DoD - University Instrumentation Program

SPECIALIZED INSTRUMENTATION FOR COMPUTATIONAL  
FLUID DYNAMICS RESEARCH

FINAL REPORT

K.N. GHIA\*

Department of Aerospace Engineering and Engineering Mechanics  
University of Cincinnati  
Cincinnati, Ohio

This specialized instrumentation for Computational Fluid Dynamics research was provided by the Air Force Office of Scientific Research, Bolling Air Force Base, under AFOSR Grant No. 84-0275<sup>†</sup>, with Major Michael Francis as Technical Monitor.

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Availability /	
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\* Professor and Principal Investigator.

† Research Title for the Grant was "Analysis of Three-Dimensional Viscous Internal Flows in Turbomachinery."

June 1987

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SPECIALIZED INSTRUMENTATION FOR COMPUTATIONAL  
FLUID DYNAMICS RESEARCH  
FINAL REPORT

The objective of this grant proposal was the improvement and further development of the existing special-purpose computational fluid dynamics (CFD) research facility so as to permit the efficient evaluation of numerical solutions of complex fluid flow problems. The weakest link in the then existing PRIME 650 computing system was its CPU, which was a serial processor. A CPU upgrade of that PRIME 650 computer system was proposed via incorporation of the high-performance PRIME 9950 computer system, with a 32-bit CPU, featuring emitter coupled logic circuitry and pipelined architecture. This proposed PRIME 9950 CPU upgrade, together with CSPI MAP-6420 array processor (acquired earlier under the DoD-URI Program), should have provided a highly efficient superminicomputer system for both interactive as well as batch-mode usage in developing CFD algorithms for complex flow problems. A revised budget was requested by AFOSR and was submitted to Ms. Kathy Kissinger, AFOSR/PKD, along with a letter (see Appendix) dated June 7, 1984, from Arlene Jung of our Research Office.

By the time the award was made, the Perkin-Elmer 3250 MPS Computer System was available in about the same price range. This system appeared to have significantly larger throughput as compared to the PRIME computer or any other superminicomputer systems for comparable price. It also offered possibility for future enhancement, with the use of additional processors which also permitted parallel computing. Hence, permission was sought from Major Michael Francis, Technical Monitor, via our letter of July 2, 1984. The Perkin-Elmer 3250 Computer System with 2 APU's was installed in

September 1984. The Department of Aerospace Engineering and Engineering Mechanics spent \$36,450 of its own funds to get a system that could help to take care of basic computing needs for algorithm development for about five years. It should be noted that the University of Cincinnati had received 45% discount on the purchase of this equipment. Precision Visuals Software, one of the most comprehensive graphics utility routines in the market, was bought at 70% discounted price in December 1984.

Although the Perkin-Elmer 3250 MPS computer system had adequate number-crunching ability, it posed a variety of hardware and software problems, and resulted into a computer system (perhaps this specific model) which was not reliable and one which crashed frequently. As of July 2, 1985, a request was made to replace this specific model with one that performs reliably; after lengthy negotiations, final approval of this request came on March 20, 1987. Even this approval does not allow us to have APU's which permit the development of algorithms using parallel processing. In any event, the attached document in the appendix will provide you evidence as to why it was important to keep the grant active and delay the submission of this final report.

In spite of the difficulties the Perkin-Elmer 3250 MPS computer system has posed, work on the following DoD-Projects was performed, to a variable degree, using this computer system for each of the following grants and contracts: AFOSR Grants 80-0160, 80-0047, 83-0252, 85-0231, 87-0074; ONR Contracts N-0014-76-C-0364, N-0014-79-C-0849; WPAFB Contract F-33615-82K-3609, ARO Contract DAAG29-82-K-0029 and several NASA contracts.

# Concurrent Computer Corporation

## Amendment To Agreement

84-0049

CCUR and Buyer agree that the terms and conditions of the specified Agreement shall be amended as follows:

Agreement No.  
01

Amendment No.

Effective Date

1. Upon delivery of the proposed upgrade uni-processor Model 3280MPS system University of Cincinnati and CCUR will both provide the necessary cooperation in order to insure the system is installed in a timely manner.
2. University of Cincinnati authorizes the replacement of the existing Model 3260MPS with the new 3280 system as described in Bid #A1919 as the final 3280 configuration. This Model 3280 replacement is proposed at no charge to UC. The Supplementary Proposal to the University of Cincinnati is to be considered as an optional expansion to the proposed replacement configuration. To exercise this option a purchase order will be executed by University of Cincinnati as per the attached quotation number 52831-87-007-00. It is preferred that this option be exercised (if desired) immediately for expansion items in order to facilitate the integration of a complete and tested system (including expansion items), therefore a response date of June 30, 1987 is recommended. In consideration maintenance and support rates will be as per University of Cincinnati's current Customer Service Division agreement for the rest of calendar year 1987.
3. Upon a successful installation and acceptance of the new 3280 system as described in Bid #A1919, the University of Cincinnati will allow Concurrent Computer Corporation and its representatives reasonable access to the 3280 site based upon availability for the purpose of prospective client site visits.
4. University of Cincinnati agrees not to resell the uni-processor Model 3280MPS as described in Bid #A1919, except upon a written mutual agreement signed by University of Cincinnati and Concurrent Computer Corporation, for a period of three years to begin at date of installation.

All of the terms and conditions of the specified Agreement shall remain in effect except as modified by this Amendment.

BUYER

 JUN 24, 1987

By (Signature and Date)

K. N. GHIA

Name (Type or Print)

PROFESSOR & Project Director  
Title DoD Instrumentation Grant

CONCURRENT COMPUTER  
CORPORATION

By (Signature and Date)

Name (Type or Print)

Title

END

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